

ARMY GROUND LIAISON TEAMS

A thesis presented to the Faculty of the U.S. Army  
Command and General Staff College in partial  
fulfillment of the requirements for the  
degree

MASTER OF MILITARY ART AND SCIENCE

by

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## ABSTRACT

ARMY GROUND LIAISON TEAMS by MAJ James J. Lauer, USA, 77 pages

This study investigates the manning, training, and equipping of the ground liaison teams (GLTs) the United States Army provides to support those United States Air Force (USAF) fighter wings and squadrons with an assigned air-ground support mission. It asserts that the Army has repeatedly overlooked its doctrinal requirements to provide qualified, trained, and properly equipped personnel to perform this critical joint function.

The study conducts a historical review of the origins of the Army ground liaison officer (GLO) and details the evolution of GLTs beginning with World War II, through the Korean War, the Vietnam War, and the Persian Gulf War. Trend analysis identifies a reoccurring pattern: the recognition of requirements for GLTs during a period of conflict, the late filling of these requirements, the inadequacy of supporting equipment, the identification of similar lessons learned during post-conflict reviews, the reaffirmation of the doctrinal necessity for GLTs, and the perpetual reduction of GLO requirements.

The study recommends the standardized manning, training, and equipping of GLTs to replace the disparities which currently exist among the unified commands.

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## LIST OF ABBREVIATIONS

AAF	Army Air Forces
AAGS	Army Air-Ground System
ACC	Air Combat Command
ACO	Air Control Order
AOC	Air Operations Center
AFF	Army Field Forces
AGF	Army Ground Forces
AGLS	Air-Ground Liaison Section
AGOS	Air-Ground Operations System
ALO	Air Liaison Officer
ATO	Air Tasking Order
BCD	Battlefield Coordination Detachment
BCE	Battlefield Coordination Element
CAS	Close Air Support
CENTAF	Central Command Air Forces
CINCFE	Commander in Chief, Far East
EUSA	Eighth United States Army
FAC	Forward Air Controller
FAF	Fifth Air Force
FC	Field Circular
FEAF	Far East Air Forces
FEAGOS	Far East Air-Ground Operations School
FEC	Far East Command
FM	Field Manual
FRAGORD	Fragmentary Order

FORSCOM	Forces Command
GLT	Ground Liaison Team
GLO	Ground Liaison Officer
IMA	Individual Mobilization Augmentee
JFACC	Joint Force Air Component Commander
JFC	Joint Force Commander
JFLCC	Joint Force Land Component Commander
JOC	Joint Operations Center
LFASCU	Landing Force Air Support Control Unit
MOA	Memorandum of Agreement
MOS	Military Occupational Specialty
NATO	North Atlantic Treaty Organization
OAS	Offensive Air Support
OPORD	Operations Order
PCS	Permanent Change of Station
ROK	Republic of Korea
SEAD	Suppression of Enemy Air Defense
SITREP	Situation Report
TAC	Tactical Air Command
TACP	Tactical Air Control Party
TACS	Theater Air Control System
TAGS	Theater Air-Ground System
TAS	Tactical Air Support
USACOM	United States Atlantic Command
USAF	United States Air Force
USAFAGOS	United States Air Force Air-Ground Operations School
USAFE	United States Air Forces in Europe
USAFFE	United States Armed Forces in the Far East
USAREUR	United States Army Europe

USCENTCOM	United States Central Command
USCONARC	United States Continental Army Command
USEUCOM	United States European Command
USPACOM	United States Pacific Command

## CHAPTER 1

### INTRODUCTION

#### Personal Significance

I arrived at Hahn Air Base, the Federal Republic of Germany, on Easter Sunday in April 1990. I had just departed from a battalion-level position with the U.S. forces stationed in the Republic of Korea and was being assigned to an Army ground liaison team (GLT) supporting a U.S. Air Force fighter wing. As an Army aviator, I looked forward to seeing how the flyers of a sister service lived but knew little about what my duties and responsibilities would entail. Nine months later, I was briefing air crews on the current ground situation in Iraq and Kuwait, reminding them of the Commander-in-Chief, United States Central Command's (USCENTCOM) intent and updating them on changes to the friendly and enemy ground force dispositions and operations in their target areas.

The air and ground forces deployed during Operations DESERT SHIELD and DESERT STORM came from all corners of the globe. The U.S. Air Force units I supported came from every unified command that had fighter aircraft assigned. Each brought a different understanding of the role I filled as an Army ground liaison officer (GLO). Some air crews had never worked with a "GLO" before and did not understand why this Army officer tried to sit in on all their briefings. Many recalled knowing that the wing or parent Air Force headquarters often had an Army officer in the operations center but had never seen him. Others had very high expectations of the quantity and quality of information they

counted upon me to provide and would always seek me out early in the premission planning process. I questioned the disparity.

After returning to Germany, I came across an old copy of the Illustrated London Times among the files left by my predecessors. It included sketches of an Army GLO operating with the Second Tactical Air Force from a forward field location just off the Normandy beaches in July of 1944.<sup>1</sup> The hook was set. How long had the concept of a ground component liaison to the air component forces existed in the U.S. military? Why did it appear to have evolved differently in the various theaters of operation? Should its structure be standardized?

#### Problem Statement

My thesis investigated the U.S. Army's use of ground liaison teams (GLTs) to enhance the effectiveness of U.S. Air Force (USAF) tactical fighter assets in the air-to-ground role. My primary research question was: How should the U.S. Army man, train, and equip ground liaison teams to support U.S. Air Force fighter wings and squadrons?

#### Secondary Questions

A number of secondary questions needed to be answered during this research. Are ground liaison teams even necessary at fighter wing or squadron level? If not, should they be disbanded? What are the mission essential tasks GLTs must be able to perform. How were GLTs manned, trained, and equipped during previous conflicts including: World War II, Korea, Vietnam, and the Persian Gulf War. Were these organizations adequate to perform their assigned tasks? How are current ground liaison teams organized and trained? Are there any significant differences between major commands? Should ground liaison teams be standardized?

### Background

Since the first use of aircraft for military purposes, air and ground forces have operated in close proximity to each other. These first aircraft were most often sent on unilateral missions and not integrated into the ground maneuver scheme except as platforms for reconnaissance and observing indirect fires. Eventually the munitions they carried became more lethal and precise. Ground force commanders began to see additional utility in incorporating aircraft into their plans, though often only as added fire support. This led to increased employment closer to friendly forces. Errors in targeting or fluctuations of the ground battle often resulted in limited effects on the enemy force or even fratricide. The need to establish timely control measures and communications links between the ground commander and the air crews operating above him became critical.

For the last five decades the air liaison officer (ALO) and the ground liaison officer (GLO) have been part of this linkage. The ALO, a flight-rated Air Force officer, advises and assists the ground force commander and his staff in planning for the employment of tactical air assets. He coordinates their deconfliction with other fires and provides final attack information or control as required, via his tactical air control party (TACP). The communications systems at the ALO's disposal allow him to coordinate directly with both the supporting aircraft and Air Force representatives at the next several higher headquarters. His knowledge enhances the ground commander's understanding of the capabilities and limitations of the supporting fixed wing aircraft.

The GLO advises and assists the air force commander and his staff in planning the execution of assigned ground support missions. His portrayal of the ground tactical situation provides the mission

planners and air crews the situational awareness necessary to understand the ground commander's intent for their employment. While the details of who, what, where, and when are enumerated in the air-tasking order (ATO) of the day, the GLO often illuminates the why and aids the planners and crews in determining the how. His understanding of the current tactical situation can directly influence the anticipated methods of attack and even changes to the munitions employed.

This two way flow of information has been invaluable in maintaining joint air and land capabilities. While the means exist to pass this data without the ALO or GLO, a breakdown at either end of the Theater Air-Ground System (TAGS) can be disastrous. The increased use of new communications technology and automation has allowed information to move quickly about the modern battlefield. The basic tasks of the ALO and GLO are to insure that what goes in and comes out of these systems is not useless garbage.

Although the U.S. Air Force often saw its close support role as tertiary behind those of airspace control and strategic attack or interdiction, it dedicated great effort throughout its history to improving and refining the capabilities of the personnel and equipment that execute the Air Force portion of the TAGS mission. Under the Theater Air Control System (TACS), the Air Force has placed officers and airmen specifically trained to accomplish these tasks at all echelons of Army tactical and operational command, down to selected maneuver battalions.

The officers are experienced pilots drawn from operational flying positions to ensure their tactical proficiency. As an incentive to volunteer for ALO duty, the Air Force guarantees these officers a follow on flying assignment. The enlisted airmen who man the tactical air control parties are from a career field which develops skills

designed specifically to coordinate air-ground integration and terminal attack control. They do this work every day of their Air Force careers. Together, equipped with state-of-the-art communications systems and detailed training requirements, they provide an Air Force link which rivals the responsiveness of the Army's indirect fire system.

This was not always the case. Numerous after-action reviews, theses, studies, test boards, and congressional hearings have addressed over the years how these control parties should be organized and equipped. At one time the Army was responsible for providing all the equipment and enlisted serviceman requirements, while the Air Force provided the experienced pilots to be the ALOs. Today these TACPs are Air Force manned and equipped with the Army providing administrative and logistic support on a mission specific basis.

The U.S. Army zealously pursued the fielding of more and better equipped control parties to provide direct support to its maneuver forces. Meanwhile, it repeatedly overlooked its reciprocal requirements to provide experienced ground liaison teams to the supporting tactical air units in accordance with its own Army Air-Ground System (AAGS). Historically, these positions have often remained vacant and are filled only after protracted hostilities reaffirm their necessity.

To man its GLTs the Army selects midgrade captains and junior majors from combat arms branches and noncommissioned officers from infantry platoon and company level. Most have no previous experience in planning air-to-ground operations. After this assignment they return to the force and rarely perform an AAGS or TAGS function again.

Following World War II, the Army had a dedicated Ground Liaison Officer School. The only current Army training requirement for ground liaison officers is to attend one of two orientation courses the U.S. Air Force hosts in its Air-Ground Operations School (USAFAGOS) at

Hurlburt Field, Florida. The Joint Air Operations Staff Course is for air operations center (AOC) personnel and focuses on understanding the fundamental coordination considerations performed primarily at an AOC with emphasis on the air tasking order (ATO) and air control order (ACO) process. The Joint Firepower Control Course is for tactical air control party and selected Army personnel. It focuses on the integration of air support at division level and below. These courses no longer include the one-hour block of instruction which covered GLO duties and responsibilities.<sup>2</sup>

While at one time GLTs were authorized transportation assets and had direct support of dedicated communications units, today the Army provides GLTs no organic unit equipment. Under current major command memorandums and interservice support agreements, GLT requirements are the responsibility of the supported Air Force unit.<sup>3</sup>

This system works, but is it the best way to do business? Some major commands repeatedly question the utility of GLTs, while seeking ways to meet force reduction requirements. Is the Army consciously accepting any risks? If so, what are they? In light of the current force reductions and increased emphasis on interservice dependency, does the Army require a more efficient system given the lethality of current weapons systems and the national attention fratricide creates? This research hopes to explore these issues in depth.

#### Assumptions

The critical assumption of this thesis was that requirements will continue for close integration of Air Force air and Army ground maneuver assets under current U.S. joint tactical doctrine. As the maneuver forces of the Army are reduced in number, the importance of air power as a combat multiplier increases. While presenting coordination

problems for Air Force assets conducting interdiction operations, the increased operational ranges and effectiveness of Army deep fires and attack helicopters do provide alternatives and augmentation to limited USAF suppression of enemy air defenses (SEAD) assets.

The cyclic doctrinal discussions continue. What is close air support (CAS)? Which service(s) should be responsible for providing it? What control measures, if any, should delineate responsibility for interdiction planning and/or coordination? What control should the Joint Force Air Component Commander (JFACC) have over Army rotary wing aircraft? While current joint and service doctrines address each of these subjects, they further serve to highlight the requirements for close coordination.

While the trend in current operations is to assign functional control to various component commanders (air, land, sea, special operations), there is no foreseeable merger of the Air Force and Army into a single service. If this were the case, the requirements for integration would remain, but the mechanisms might change to more closely resemble those of the Marine Corps or the former Army Field Forces.

#### Key Definitions

Throughout the evolution of joint military doctrine, the meanings of many terms and phrases have also changed. Some definitions differed between individual services or even between theaters of operation. Except as noted, this thesis used the meanings as defined by Joint Publication 1-02, The Department of Defense Dictionary of Military and Associated Terms, 23 March 1994.

A ground liaison officer (GLO) is an officer trained in offensive air support activities. Ground liaison officers are normally

organized into parties under the control of the appropriate Army commander to provide liaison to Air Force and Naval units engaged in training and combat operations.

A ground liaison team (GLT) is the term currently used by both the Army and the Air Force to combine what JP 1-02 identifies as either a ground liaison party (an Army unit consisting of a variable number of personnel responsible for liaison with a tactical air support agency) or a ground liaison section (an Army unit consisting of a variable number of Army officers, other ranks, and vehicles responsible for Army/air liaison under the control of Army headquarters).

The Theater Air-Ground System (TAGS) is not a formal system in itself, but the actual sum of the various service component air-ground systems. It refers to the organizations, personnel, equipment, and procedures that participate in the planning and execution of air operations.<sup>4</sup>

The Army Air-Ground System (AAGS) provides interface between Army and tactical air support agencies of the other services in the planning, evaluating, processing, and coordinating of air support requirements and operations. It is composed of appropriate staff members including G-2 air and G-3 air personnel and necessary communications equipment.

The Air Force's Theater Air Control System (TACS) is the organization and equipment necessary to plan, direct and control tactical air operations and coordinate air operations with other services. It is composed of control agencies and communications-electronics facilities which provide the means for centralized control and decentralized execution of missions.

The Air-Ground Operations System (AGOS) is an Army-Air Force system providing the ground commander with the means for receiving,

processing and forwarding the requests of subordinate ground commanders for air support missions and for the rapid dissemination of information and intelligence.

An air operations center (AOC) is the principle air operations installation from which aircraft and air-warning functions of combat air operations are directed, controlled, and executed. It is the senior agency of the Air Force component commander from which command and control of air operations are coordinated with the other components or services.

Offensive Air Support is not defined by JP 1-02. For the purpose of this research the operational definition included both the air-ground missions of tactical air support and close air support as defined by JP 1-02.

Tactical air support (TAS) consists of those air operations carried out in coordination with surface forces which directly assist land or maritime operations.

Close air support (CAS) is air action by fixed and rotary wing aircraft against hostile targets which are in close proximity to friendly forces and which require detailed integration of each air mission with the fire and movement of those forces.

#### Limitations

The scope of this research effort was limited to U.S. Army GLOs and GLTs assigned to support those U.S. Air Force tactical fighter wings and squadrons with an air-ground support mission. When an intermediate command, such as a group headquarters, was established between these levels, GLTs supporting these units were also examined. The research was further limited to the period from January 1942 to January 1996. This allowed the inclusion of established doctrinal publications

applicable during World War II, as well as any draft doctrinal publications available at the time of the research.

During this period, the research was limited to operations conducted during World War II (both European and Pacific theaters), the Korean War, the Vietnam War, and the Persian Gulf War. Currently existing ground liaison structures for the major commands located in the continental United States, Europe, and the Pacific were also examined. The lack of available unclassified primary references on the subject during the Vietnam war period is addressed under recommendations for further research. Most of the information concerning GLT structure, effectiveness, and lessons learned during this period was derived from secondary sources and historical reports focused on broader issues between the air and ground forces. The availability of some postwar information allowed limited conclusions to be drawn. These were either noted when included in the analysis or omitted.

#### Delimitations

The Army Air-Ground System has always provided for the assignment of ground liaison officers and teams to support U.S. Air Force units at echelons above the wing and squadron. The inclusion of ground liaisons at these higher echelons was not examined. This would have required addressing joint air operations center issues, including the Army Battlefield Coordination Element or Detachment (BCE/BCD). (While the evolution of the BCD impacts on GLT operations, the BCD concept, undergoing major review at the time of this research, was well beyond my research scope.) The exchange of information among GLTs, the BCD, and the AOC was examined.

An analysis of the coordination and liaison elements used by the U.S. Navy and Marine Corps was not within the scope of this research.

This was primarily due to the unique relationship between Marine air and ground elements. The same held true for the relationship between Army aviation and its ground maneuver forces. In both cases the unity of command, under a single service component commander at the tactical level, simplifies coordination. This research was focused on the problem associated with coordination of "joint" air-ground operations.

The structures of GLTs employed by other North Atlantic Treaty Organization (NATO) nations were also excluded. While many parallels in their development existed, the unavailability of NATO classified holdings made their inclusion impractical. The GLT structure employed by U.S. forces within the European Command (EUCOM) operates within the NATO model and did provide some insights.

#### Research Significance

Within the covers of Joint Publication 1, Joint Warfare of the U.S. Armed Forces, General of the Army George C. Marshall, Fleet Admiral Ernest J. King, and General of the Air Force Henry H. Arnold all address the importance of close, effective coordination between the services as the basis of successful joint operations. Regarding the Persian Gulf War, the same document points out that "liaison teams played an important and effective role in reducing the frictions associated with a large and complex collection of forces."<sup>5</sup> After each major conflict the role of the ground liaison team has been reaffirmed. Ground liaison officers are jointness at its lowest level.

During the current period of resizing in the military, the service component chiefs are discussing ways to trim any excesses that may still exist. With the reduction in the number of Air Force fighter wings and squadrons and the increased emphasis on automating the dissemination of battlefield information, every remaining ground liaison

officer position has the Army Chief of Staff's attention. U.S. Army Forces Command has begun assigning Army Reserve individual mobilization augmentees against Air Combat Command fighter wing positions. This has serious operational implications for a force projection based military.

Do the Army commanders of today and tomorrow need a ground oriented officer to interpret and impart their intent and concepts to the executors of air power? If so, then quality needs to be infused in the manning, training, and equipping of these small elements. If not, then as a service, the Army needs to expect less from its joint air-ground partner, to press for more restrictive control measures, and to establish greater margins of error to safeguard its most precious assets, its soldiers.

## CHAPTER 2

### LITERATURE REVIEW

#### Introduction

The initial examination of the number of available holdings on the history of integrating air and ground operations appeared quite daunting. However, when the field was reduced to those major works that addressed the specific research problem, the number of significant treatises quickly diminished. The primary research question was: How should the U.S. Army man, train, and equip ground liaison teams to support U.S. Air Force fighter wings and squadrons? This review first examined the works covering the origins of ground liaison officers. It then progressed through a review of the major writings covering the broad discourse on the integration of air-ground operations from the end of World War II through the Persian Gulf War. Focusing on the research question, it examined these works to determine if and how they addressed the organization and operations of ground liaison teams. The review concluded by noting any patterns and gaps in the current literature and identifying specific concerns not addressed.

#### Origins

The first significant contribution to research in the field was completed by the Historical Section of the Army Field Forces in 1948. As part of the post-World War II attempt to capture the organizations and operations employed during that conflict, Colonel Kent Greenfield completed a study of air-ground operations.<sup>1</sup> Based on research conducted during the war, and access to numerous position papers, War

Department and interservice memorandums, after-action reviews and test board findings, he explained the responsibilities and position of the Army Ground Forces with regard to the evolution of air power and air-ground cooperation. The study recounted prewar doctrine and combined training, detailed how the system was changed on battlefields both in Europe and the Pacific, and consolidated the lessons that were learned. It includes a complete account of the initial establishment of ground liaison officer positions. Significant insight was provided into the reluctance of senior service officers to take any actions legitimizing the independence of the then Army Air Forces. These initial positions continue to impact on the organization of ground liaison teams even today.

#### Key Works

The development and employment of the air-ground system that existed for the Normandy invasion and subsequent battle for the European continent was also documented by the Air Force. The Condensed Analysis of the Ninth Air Force in the European Theater of Operations, completed by Headquarters, Army Air Forces, in 1946 and reprinted by the Office of Air Force History in 1984, is one of the most referenced sources for research on the subject of air-ground operations.<sup>2</sup> While primarily focused on the operational structure that existed between the Twelfth Army Group and the Ninth Air Force, this study did mention the formal exchange of air and ground liaison officers between the commands. It addressed in its conclusions and recommendations the need to continue the practice and gave the ground liaison officer system much of the credit for the success of air support during the European campaign.

In a report for the Air Command and Staff College, Michael L. Wolfert synthesizes numerous histories concerning the evolution of air-

ground doctrine during World War II. He ties the operational and tactical processes together, especially in his study of the operations of the Third U.S. Army and the close support it received from the XIX Tactical Air Command. He enumerates the contributions of ground liaison officers in providing "cross communications" to improve the situational awareness of pilots and air crews supporting Patton's sprint across Europe. He also identifies the importance of the communications support to making that system work.<sup>3</sup>

Dr. Robert F. Futrell's Ideas, Concepts, Doctrine: Basic Thinking in the United States Air Force, 1907-1960 provides a valuable bridge between air-ground operations during World War II and the Korean War. In this work, he traces the written doctrine that fueled not only change in the relationship between the air and ground forces, but that also provided the basis for the manning, training, and equipping of ground liaison teams. While Dr. Futrell focuses primarily on the larger issues concerning the early Air Force's role, missions, and relationship with the Army, many of these issues indirectly affected the development of ground liaison teams.<sup>4</sup>

The official histories of both the Army and Air Force record the lack of ground liaison personnel and problems with air support at the beginning of the Korean War.<sup>5</sup> Three U.S. Air Force historical studies cover consecutive periods of the war and provide the basis for most of the works addressing this conflict.<sup>6</sup> With regard to air-ground operations, most treaties<sup>7</sup> focus on three specific issues: limited emphasis on ground support training by the Far East Air Forces; initial problems with the effectiveness of the joint operations center (JOC), responsible for coordinating air-ground operations throughout the theater; and the development and employment of ground and airborne forward air controllers.

The first two issues are directly tied to the manning, training, and equipping of ground liaison teams. The first USAF historical study recorded the initial shortages of personnel and communications for ground liaison teams. It also noted severe problems with coordinating supporting air attacks and the resulting fratricides.<sup>8</sup> The second historical study recounts the arrival of ground liaison personnel and supporting communications elements. It notes improvement in the effectiveness of the air-ground system following these events and modifications to the ALO/forward air controller (FAC) portion of the system. The study identifies efforts to develop additional air-ground training within the Far East theater and further improvements to the communications support provided ground liaison officers.<sup>9</sup> The third study addresses the effects of the additional air-ground training and new communications support equipment. On the subject of air support, it focuses primarily on the volume of sorties flown during the Korean conflict and records the recommendations of joint boards at the end of the War. This study notes that the ground liaison system that existed at the war's end finally matched the structure addressed in prewar doctrine.<sup>10</sup>

Most of the works that cover air power during the Vietnam War period address either strategic or operational issues. The bulk of available literature on air support focused on the role of the airborne FAC. The official Air Force histories do address the air-ground system, but only note the arrival of the first GLOs and the limits of their communications capability.<sup>11</sup> Most works concentrate on the air-ground structure that existed during the Vietnam War and contrast it to the Korean War structure. Due primarily to the nature of ground operations, the emphasis was on the coordination at the joint level and final control by FACs at the tactical level.<sup>12</sup>

Dr. Futrell's second volume to Ideas, Concepts, Doctrine: Basic Thinking in the United States Air Force, 1961-1984 provides another valuable bridge between the wars. He tracks the doctrinal focus of air power through the Vietnam era until just prior to the Persian Gulf War. While Army AirLand doctrine espoused the importance of integrating air support as a combat multiplier, the primary Air Force concern was the controversy over the Army's fleet of helicopters and the roles and missions debate between the services. The memorandum of agreement between the service chiefs, known as the "31 Initiatives," addressed CAS, ALOs, and FACs, but made no mention of GLOs.<sup>13</sup>

Dr. Richard M. Swain observed that both the air and ground portions of the Gulf War reemphasized the significant role of ground liaison officers. In Lucky War, he reviewed the difficulties that existed with executing the Army's AirLand doctrine and the reliance on liaison elements at all levels of the air-ground system to insure effective execution of the joint force commander's intent. His work is the first significant step in sifting through the bulk of available data, most of which is still in after-action review and formal lessons learned form.<sup>14</sup>

#### Summary

The starting point for this research was based on the initial authorizations for ground liaison officers chronicled by the Army Field Forces study. Outside of doctrinal publications, few direct references are made concerning the organization, operations, or effectiveness of Army ground liaison teams. Collectively, the bulk of literature addressed, in detail, the evolution of joint air-ground cooperation and debate at the strategic and operational levels. When tactical operations at the lower levels are addressed, the general trend was to

discuss service specific issues, techniques, capabilities, and limitations.

No significant work was found to focus on the organization and operations of ground liaison teams. This gap legitimized the need for specific research to answer the question: How should the U.S. Army man, train and equip ground liaison teams to support U.S. Air Force fighter wings and squadrons.

## CHAPTER 3

### RESEARCH DESIGN

#### Methodology

How should the U.S. Army man, train, and equip ground liaison teams to support U.S. Air Force fighter wings and squadrons? A combination of research methods was required to properly answer this question. The thesis research began with a historical review. The origins and initial development of the Army's ground liaison teams were examined and then their evolution traced through subsequent major conflicts. A trend analysis was conducted to identify the existence of any significant reoccurring issues concerning GLT organization and operations and to determine their relative impact on ground liaison team effectiveness. Finally, current ground liaison team structures were examined in light of these trends, and recommendations were made concerning future ground liaison team requirements and their employment.

#### Historical Review

The historical review answered many of the subordinate questions concerning ground liaison teams. The first questions focused on the origins of the GLTs. Why were ground liaison officers necessary? What were the primary functions they were expected to perform? Did senior Army or Air Force leaders have any key concerns that influenced the initial development of the ground liaison teams?

Air-ground operations during World War II, the Korean War, the Vietnam War and the Persian Gulf War formed the framework to answer the questions concerning ground liaison team evolution. Initially,

doctrinal publications for the period were examined to determine the existing requirements for GLTs and their anticipated role in air-ground operations. How were ground liaison teams to be organized and equipped? What qualifications were required of soldiers assigned these duties? What training were they expected to receive? How were they to operate, and what tasks were they expected to perform?

Then after-action reports, unit historical reports, lessons learned submissions, and correspondence between supported air and ground force commanders were examined to determine what occurred. How were ground liaison teams actually organized and equipped? What qualifications did the soldiers assigned these duties in fact have? What training did they really receive? How did they actually conduct their operations and what tasks did they perform? How effective were they at accomplishing these tasks? The strengths and weaknesses of each type of organization were recorded.

#### Trend Analysis

An analysis of the historical information was conducted to identify the existence of any significant reoccurring trends. Were there any consistent disparities between doctrinal expectations and actual execution? What were they? Were the trends tied to any shortcomings in the doctrinal material? Were the trends specifically attached to one of the areas of manning, training, or equipping? What outside influences contributed to the continuation of these trends. Were the trends related to any of the senior service leader key concerns or issues that originally influenced the initial development of the ground liaison teams?

Once identified, the trends were then further explored for their relative impact on GLT effectiveness. Were the strengths and weaknesses

observed for each type of ground liaison team consistently tied to the identified trends? In light of these trends, the present organizations for ground liaison teams currently existing within the unified commands of United States Atlantic Command (USACOM), United States European Command (USEUCOM), and United States Pacific Command (USPACOM) were also examined in the same manner. Were any of the same trends found to exist within the current structure? If so, what conclusions could be drawn regarding the future expectations. Specific recommendations for future requirements and employment of ground liaison teams were then based on these conclusions.

#### Strengths and Weaknesses

The selected methodology included both inherent strengths and weaknesses. The use of the historical review allowed the accumulated data to speak for itself. The reader can validate its sufficiency and verify each conclusion for himself. The primary weaknesses of the methodology were bias and the subjective nature of the analysis. The identification of the issues influencing organizational structure was based on historical documents that could have included personal or service biases. The source and context of the historical reports were considered and addressed whenever possible. Personal bias may have influenced the subjective assessments of specific trends and measures of relative effectiveness. However, great effort was taken to remain objective during the analysis and allow the evidence to stand on its own merit as described above.

#### Summary

This methodology provided a logical cognitive framework for the thesis research. Through a combination of historical review and trend analysis, It first determined why ground liaison teams were established

and how they developed over time. The use of contrast between the doctrinal organizations for ground liaison teams and those actually existing during each period aided the identification of the key trends and many of the factors that led them. Most importantly, it facilitated the assessment of the impact of these factors and their propensity to continue to influence GLT structure in the future. This assessment was critical to answering the primary question, How should the U.S. Army man, train, and equip ground liaison teams to support U.S. Air Force fighter wings and squadrons? Understanding the influence of these factors provided the basis for the concluding recommendations.

## CHAPTER 4

### ANALYSIS

#### Introduction

This chapter reviews the historical development of Army ground liaison teams from their origins during World War II through the major conflicts of the Korean, Vietnam and Persian Gulf Wars. It examines the issues concerning ground liaison team organization and operations and identifies reoccurring trends. It then examines current GLT structures in light of these trends and answers the primary research question: How should the U.S. Army man, train, and equip ground liaison teams to support U.S. Air Force fighter wings and squadrons?

#### Historical Review

##### World War II Origins

Between 9 April 1942 and 20 April 1945, the only doctrinal guide to tactical air cooperation between air and ground units was the War Department's Basic Field Manual 31-35, Aviation in Support of Ground Forces. While this document primarily established the principle that aviation should be controlled centrally by an air component commander, it did make general provisions for liaison with ground forces. This liaison was limited to the higher levels of the air component staff with a "representative of the ground commander of the supported units . . . at the air support command post." The manual further suggested that the field orders of the supported ground commander should include instructions for supporting aviation concerning its mission, method of employment, the ground units designated to receive direct support, and

the geographic area of expected air operations. Finally, it charged the air unit's intelligence officer with the responsibility to "maintain friendly plans . . . and keep himself posted at all times on the situations of both friendly and enemy ground forces." While this clearly supported the growing movement toward the autonomy of the air forces, it placed the burden of coordination requirements on the supporting air units.<sup>1</sup>

Commonly referred to as the Army Air Force's "Declaration of Independence" and "Magna Carta," War Department Field Manual 100-20, Command and Employment of Air Power, published on 21 July 1943, did address the subject of air-ground liaison. Most of the focus on this manual revolved around its bold introductory paragraphs which established the "co-equal and interdependent" nature of air and land power, the primacy of gaining air superiority prior to land operations and the need to centralize command and control of air power under the air force commander. It spoke in general terms about the "exchange of liaison officers . . . who are well versed in air and ground tactics" and the need for "adequate communications" to support them.<sup>2</sup> The new manual did not address the command levels at which the exchange of these liaison officers would occur.

Debate on the theoretical issues stirred by FM 100-20 continued through 1945 and limited the success of coordination efforts seeking official War Department guidance on the details of air-ground operations. While this new manual spoke in generalities, it obviously "rendered FM 31-35 obsolete" and left a significant void, which compelled commanders of air and ground forces in the field to adopt their own techniques for integration.<sup>3</sup>

Throughout 1942 and most of 1943, American ground and air forces failed to work in close cooperation. These failures were quite evident

in North Africa and the Mediterranean. American airmen were repeatedly bombing friendly ground formations, while American soldiers were continuing to engage friendly aircraft. Training deficiencies on both sides were often cited as the root cause and attempts to improve identification training were undertaken. Another solution, to limit mutual contact, was also tried, but neither ground nor air commanders were willing to embrace this as an acceptable long-term answer. If air and ground operations were to be truly integrated, "means had to be developed by which air and ground forces could . . . more promptly communicate to each other positions, desires, intentions and findings."<sup>4</sup>

Not everyone waited for solutions to the air-ground problems to come from the War Department. Based on the Eighth British Army and Royal Air Force system developed in North Africa, the Fifth U.S. Army and the XII Air Support Command established their own system to improve air-ground cooperation. In addition to collocating their forward command posts, Fifth Army "assumed responsibility" for coordinating the air support requests of its subordinates, freeing the XII Air Support Command from the details of mission processing and allowing it to focus on execution of those missions approved by the senior ground commander. From within its headquarters assets, Fifth Army created an "air section" as part of the operations (G-3) staff. This section worked directly with the operations staff in the air support command and included ground liaison officers who received specialized training in air-ground operations. These officers were sent to the aerodromes being used by the XII Air Support Command, while other similarly trained officers were sent forward to ground units to take over the role of the air control parties. Fifth Army also provided the radio communications support

necessary to reach its ground liaison officers at the supporting aerodromes.<sup>5</sup>

The ground liaison officers were a vital part of the newly established air-ground system. They were kept abreast of the ground tactical plan, current friendly and enemy situations, and informed of any anticipated air support requests. To aid the air unit, the GLOs maintained the ground situation map, updated the location of the bomb safety line forward of friendly troops, assisted in the briefing of individual pilots prior to flying support missions, "interrogated" or debriefed them upon their return and forwarded all key information obtained to the Army air section. All air support requests were reported by the Army air section directly to the GLO. Even before missions had been approved by the Army headquarters, the GLO would be collecting and preparing mission specific information to brief the pilots. This facilitated rapid planning once the actual approved mission request was transmitted by the air support command.<sup>6</sup>

This "arrangement" between Fifth Army and XII Air Support Command accounted for only about 15 percent of the total missions that the Air Force headquarters flew during the Italian campaign. It was therefore essential to maximize the efficiency of the direct support missions that the fifth Army was receiving. Apparently it worked fairly well. On 3 May 1944, the senior commanders involved submitted the system to the War Department for adoption and requested formal authorization of the in place organizational changes. While the incidence of friendly troops being bombed was not totally eliminated, the system was termed an "operational necessity" by the senior commanders in the field.<sup>7</sup>

Meanwhile, the staffs of both the Army Ground Forces and Army Air Forces had been looking at the ground liaison officer issue since

March of 1943. Upon the recommendation of the Army Air Forces Board in July of 1943, the Air Forces began pushing to sanction what had been an ad hoc arrangement. By September of 1943, the headquarters staffs of both the air and ground forces had "tentatively" agreed to formalize the training of ground liaison officers at Key Field, Mississippi.<sup>8</sup>

Major General Lesley J. McNair, commander of the Army Ground Forces withheld his approval of this training until 2 December 1943. He was reluctant to support any form of "specialized training" and also saw additional liaison officers as contributing to the ever growing "overhead and diversion from combat duty" of Army Ground Forces assets to support the fledgling Army Air Forces. At the very least, General McNair wanted the number of ground liaison officers kept to a minimum. He also held firm to his view that supporting communications was the responsibility of the Army Air Forces.<sup>9</sup> These positions of "principle" would continue to be held by his successors and would significantly impact on the future development of ground liaison teams for years to come.

Concurrently, the use of GLOs was being tested during the Second Army's Tennessee maneuvers and later during subsequent Louisiana maneuvers. Ground officers were sent from the army, corps and division staffs, to the supporting air units. In general the level of air participation in these exercises was far below that requested by the ground forces. Modernization of the air fleet, the reorganization of the Army Air Forces, and growing requirements overseas, often meant that air play was either replicated or reduced. Regardless, the December 1943 formal maneuver results included a glowing special report on the contributions of ground and air liaison officers.<sup>10</sup>

The War Department approved the allocation of ground liaison officers to air units on 8 January 1944. In addition to GLOs designated

to support corresponding air force staff elements, these allocations included one officer from each army and corps staff to support each combat aviation group. The group was the echelon of air force command that usually occupied an aerodrome and controlled the operations of subordinate squadrons of fighter bombers. This approval also included provisions for the previously agreed upon training, the first class of which started on 31 January 1944. The British Army provided a group of experienced GLOs to assist in establishing the initial course. The War Department action did not recognize the organizational changes implemented by Fifth Army and the XII Air Support Command. It merely approved the exchange of liaison officers and provided for their training.<sup>11</sup>

#### The European Theater

Planning and staging for the eventual invasion of the European continent, the U.S. Twelfth (initially designated the First) Army Group and the Ninth Air Force studied both the British and Fifth Army/XII Air Support Command air-ground coordination models. The system they established incorporated the adjacent locating of ground and air headquarters, created a "combined operations center", directed the consolidation of all air support requests by the army, and positioned ground liaison officers at supporting aerodromes with each wing, group and separate squadron. Unlike the Fifth Army system, Twelfth Army Group established "G-3 Air" positions down to division level instead of providing GLOs to ground units. The other significant difference was that the Air Forces remained responsible for air-ground communications support.<sup>12</sup>

The ability to exercise and test this structure prior to the Normandy invasion was limited at best. Wargames and command post exercises rarely included live fly operations. Most of the GLOs

assigned to Ninth Air Force units had only their own ground combat experience, the Key Field GLO training course and the limited air play of the stateside Tennessee and Louisiana maneuvers upon which to draw. The "shake down" period for this untested system had to occur during the initial operations on the European continent and were not without their problems. Many of the detailed operational lessons learned during the Italian campaign were revisited during the initial Normandy operations, the subsequent breakout and the eventual drive east.<sup>13</sup>

In the early stages of the campaign, pilots continued to strafe and bomb friendly ground units. "The last great blunder" occurred during Operation COBRA. The tragic bombing of friendly forward battalions behind the Saint Lo to Perriers road further illustrated the need for air and ground commanders to clearly understand each others intent and purpose. Ironically, General McNair was killed in those attacks, which were aimed at creating a gap in the German front lines to assist the infantry penetration and armor breakout. Although initially very costly, the armor forces did eventually roll through those enemy defenses with fewer losses than anticipated. The on-the-job training of ground liaison officers, espoused by General McNair as the only way to truly learn their roles, was well underway.<sup>14</sup>

Ground liaisons did learn their trade by trial and error, adapting new ways of supporting the forward ground units as well as their higher headquarters. During the later part of 1944, both Seventh Army's movement through southern France and Third Army's through the north illustrated improvements in air-ground integration and the effectiveness of GLOs. As Patton's Third Army continued to push forward land line communications could not be maintained with General Bradley's Army Group. In addition to their standard responsibilities, GLOs debriefing returning fighter units of the XIX Tactical Air Command

started sending hourly reports to the 12th Army Group staff updating the forward locations of Third Army units.<sup>15</sup>

The primary purpose of the GLO was to foster a better understanding of the ground situation by the air commanders providing the tactical support and the pilots flying the missions. It was often reported by airmen that "each pilot knew what his counterpart in the tank expected," and by tank commanders that "the best tank destroyer we have is a P-47." This mutual confidence and trust was a far cry from the criticisms that came out of North Africa. Headquarters, Army Ground Forces, survey visits to the European theater near the end of 1944 found ground commanders generally in agreement "that close support by combat aviation had been excellent."<sup>16</sup> Ninth Air Force credited the "ground liaison officer system" with achieving those "highly satisfactory results."<sup>17</sup>

#### The Pacific Theater

In the Pacific theater, the Australian component of the allied forces practiced the British system of air-ground liaison, first observed in North Africa. Army Ground Forces representatives in the Pacific theater noted its effectiveness and adopted a system very similar to that of Fifth Army and XII Air Support Command. The War Department eventually authorized twelve ground liaison teams at Army level in January 1945. In February 1945, Headquarters, Army Ground Forces, requested information concerning the employment and effectiveness of GLTs within the Pacific theater of operations.<sup>18</sup>

The Sixth Army had employed ground liaison officers during both the Leyte and Luzon operations. It reported a lack of trained GLOs and took the position that the twelve authorized ground liaison teams were still insufficient to meet operational requirements. Due to the limited

number of available GLOs, the Sixth Army placed them with the air units providing the most air support, assigning one GLO to each bomb wing, fighter group, and bomb group. Trained GLOs were not initially placed at the higher Air Force headquarters levels, since these were usually located near the Army headquarters. As additional GLOs became available, they were assigned down to squadron level. In fact, Headquarters, U.S. Army Forces in the Far East (USAFPE) directly controlled the assignment of all trained GLOs as they became available.<sup>19</sup>

The second problem noted by the Sixth Army was the lack of adequate communications support. Without dedicated communications facilities, GLOs were being required to use command channels. The fact that air and especially ground units allowed these critical nets to be used by the GLO's air-ground message traffic demonstrated the importance they attached to GLO operations. Whenever possible radio teletype systems were dedicated to provide an "instant and permanent record of the message."<sup>20</sup>

The general duties of the GLOs within a GLT varied with the level to which they were assigned. The wing GLO, being the primary interface with the ground force headquarters, kept the wing commander and staff advised of the general ground situation and coordinated the activities of the group and squadron GLOs. The group GLO maintained the current ground situation map for the group commander and staff, assisted in the briefing and debriefing of pilots when possible, and forwarded post-mission reports to the wing headquarters. Squadron GLOs maintained the ground situation map, briefed and debriefed all pilots, and conducted any ground specific training the squadron required, to include basic infantry skills.<sup>21</sup>

Even with all the listed handicaps, Sixth Army reported that GLOs filled "the missing link" in the air support system "by keeping Air Force units constantly informed of the ground situation . . . and promoted the mutual understanding of both forces."<sup>22</sup>

The Tenth Army's report concerning its air-ground experience during operations on Ryukyus strongly emphasized the role of their GLOs. The lack of qualified GLOs to support this operation was rather extreme. Only two Army ground liaison officers supported the task force which included an army with two corps, a tactical air force, and an island command. Each GLO was attached to a landing force air support control unit (LFASCU), which was supporting one of the two corps.<sup>23</sup>

Once approved by the Corps headquarters, air requests were turned over to the GLO directly. Since the airfields and the front lines were in close proximity, the GLOs would obtain information directly from the requesting ground units and then brief the pilots on the pre-planned missions. Mission briefings included: the exact location and type of target, the location of friendly front lines, the desired bomb load and results, the time over target, radio frequencies to be used, the location of any enemy antiaircraft guns, and general information concerning the front-line situation and future intentions.<sup>24</sup>

Rarely was the GLO able to personally debrief the pilots since he was usually at another squadron briefing other pilots for another attack. Debriefing became the responsibility of the air unit's intelligence section. When possible, the GLOs would brief the Air Force pilots and also their ground crews concerning the effects their strikes were having on the situation at the front lines. These briefings often included damage assessment photos and were seen as a great morale booster by the air unit commanders.<sup>25</sup>

While the GLOs of the Tenth Army lacked dedicated communications support equipment, the close nature of the island operations made the use of land line and supporting air unit radios a satisfactory substitute. Much of their work was done face to face with both the supported ground and supporting air units. This very personal method of operations, insured both the enthusiastic praise of air and ground commanders alike and illustrated the extreme limitations that would have faced lean GLTs under any other circumstances.<sup>26</sup>

Throughout the Pacific theater, ground liaison teams became masters of improvisation. With no published doctrine, minimal air-ground training, primarily derived from European experiences, and an extremely limited organizational support structure, they adapted to their particular operational environment and developed systems that maximized the effectiveness of air support to the ground commander. The implications of their effectiveness, given more robust support, seemed obvious to air and ground commanders alike.

#### PostWar Doctrine

It was not until 20 April 1945, only three weeks before Germany surrendered, that the War Department finally published doctrinal guidance on the air-ground liaison system. War Department Training Circular Number 17, Air-Ground Liaison, described a "standard system" that was essentially the Fifth Army/XII Air Support Command system. What the Fifth Army had called G-3 and G-2 Airls were now an air-ground liaison section (AGLS). These sections included ground liaison officer teams at theater, army group, and army headquarters levels. Communications support to GLTs was made a ground force responsibility and signal companies, air-ground liaison, army, were created to perform that function.<sup>27</sup>

Training Circular Number 17 also provided specific guidance for the manning, equipping, and training of ground liaison teams. At the theater headquarters, the GLT personnel assigned included four majors and four enlisted technicians, fourth grade. At the army headquarters, four majors; eight captains; six enlisted technicians, fourth grade; and six enlisted technicians, fifth grade were assigned. All GLT personnel remained under the control of the appropriate theater or army headquarters until support was requested by either the corresponding tactical air force or tactical air command respectively. Ground liaison personnel could be formed into either single or double teams. A single team consisted of one officer and one enlisted technician. A double team usually consisted of one major; one captain; one enlisted technician, fifth grade; and one enlisted technician, fourth grade. Single teams were assigned to support a fighter wing. Double teams were assigned to support fighter groups, bombardment wings and groups, and strategic bombardment wings. Transportation and radio communications personnel and facilities were provided by the signal company, air-ground liaison, army. Both single and double teams were each supported by one staff sergeant, two enlisted radio operators and a single radio repairman. The signal team was to provide all necessary field equipment and supplies, radio and telephone support, and sufficient transportation to provide mobility for the supported GLT.<sup>28</sup>

The training circular stated that the enlisted technicians were to be qualified clerks. Their primary responsibilities included the writing, encoding, and decoding of all air-ground messages and the maintenance of all GLT logs and files. Their additional duties included severing as alternate drivers for the signal team personnel. The officers were to be graduates of the ground liaison officer school with previous ground combat experience desired.<sup>29</sup>

The course of instruction at the GLO school included such specialized subjects as: command and employment of air power; organization of air units of all services; characteristics, equipment, capabilities, limitations, tactics, and techniques of aviation operations; time and distance mission considerations; drafting and processing requests for air support and photographic missions; proper methods of maintain an operations map; mission planning; and the briefing and debriefing of combat air crews.<sup>30</sup>

The duties and responsibilities of the GLTs included: maintaining a current operations map showing the bomb safety line and both friendly and enemy ground force dispositions; assisting in the briefing and debriefing of combat crews, when required; and the rapid transmission of essential information concerning the result of air missions to the army information center. GLTs were to provide air units information concerning the missions, objectives, and plans of ground units and the progress of the ground battle. They were also to maintain files on the tactics, techniques, weapons, and equipment of both friendly and enemy ground forces. These files were often used to provide information briefings as well as assist in recognition training.<sup>31</sup>

Following the end of World War II, numerous studies concerning the effectiveness of the air-ground cooperation were initiated by the military services, the War Department, Congressional Committees, and private research institutions. The Air Force itself had more than 400 civilian and military analysts conducting studies as part of such organizations as the Army Air Forces Board, the Army School of Applied Tactics, the AAF Proving Ground Command, and the National Defense Research Committee. These analysts often issued opposing findings and confirmed Dr. Robert Futrell's position that, "Under such circumstances,

the operational experience of World War II could be cited to provide almost any preconception."<sup>32</sup>

One of the major attempts to capture the air-ground lessons learned during World War II was finally published on 13 August 1946 in the form of an updated War Department Field Manual 31-35, now entitled, Air-Ground Operations. This new manual superseded both the 1942 version and Training Circular Number 17 published the previous year. It changed the name of the air-ground liaison section to the air-ground operations section and resurrected the positions of the G-3 and G-2 Airst. This section, now part of the "joint operations center" (JOC), still remained responsible for interfacing with the GLTs. Under the new manual, ground liaison teams still represented army and army group level commanders at tactical air units. They were still to be supported by the signal company, air-ground, army, and their duties remained unchanged. All of the detail concerning the number, grades, and specific skill requirements of the Army personnel that constituted a ground liaison team were omitted. The entire manual remained general in nature and addressed merely the responsibilities of sections and key individuals without dictating their structure.<sup>33</sup> While this may have been an attempt to allow the various theaters to tailor organizations to their needs, it was probably in all reality an anticipation of the vast reduction the military services were facing at the time. Tables of organization for ground liaison throughout the force would be in a constant state of flux, until further detailed guidance was provided by a joint directive late in 1950.

#### The Korean War

The years prior to the start of the Korean War saw the newly independent United States Air Force preoccupied with its strategic and

air supremacy roles. Within the Far Eastern Air Force (FEAF), the focus was mostly on air-to-air intercept and counterair training with the sleek new Sabre jets that were now part of the Air Force arsenal. Their primary mission was air defense. Joint air-to-ground exercises were limited to largely "canned" demonstrations over clearly marked ranges. The Eighth Army's focus during this period was on battalion level training. Only sixteen of the twenty-five such "exercises" conducted in the Far East Command (FEC) included the exchange of liaisons. Limited to the Eighth United States Army (EUSA) and Fifth Air Force (FAF) command levels, these liaisons were primarily concerned with the orchestration of demonstration details for visiting dignitaries.<sup>34</sup>

Initial ground actions, following the attack by the North Korean Army, found United Nations and U.S. troops operating without their normal artillery support. Consequently, the use of close air support was rather extensive. In fact, during the first four months alone, FEAF aircraft flew "more than a third as many sorties as the powerful Ninth Air Force at the height" of its operations during World War II. The vast majority of these sorties were either close air support or interdiction missions.<sup>35</sup>

Sadly, many of the air-ground lessons learned during that earlier war appeared to have been forgotten. During the first days and weeks, the U.S. Korean Military Assistance Group (KMAG) reported numerous friendly air attacks against Republic of Korea (ROK) positions, troop columns, and trains. U.S. Army officers reported being attacked five times on 3 July in the vicinity of Suwon. Friendly ammunition dumps, airstrips, and even Korean Army headquarters were bombed and strafed the day before the now infamous Task Force Smith moved into position.<sup>36</sup>

Some of the more senior pilots with World War II experience suggested that the lack of ground liaison officers may have been a factor. They noted, "There were not the army officers present at briefings that we had in Europe in World War II."<sup>37</sup> The truth was that the organizations and structure specified in the 1946 version of Field Manual 31-35 no longer existed. The ground liaison teams and air-ground operations sections described within that publication were neither manned nor equipped. A few theater and army-level operations staff officers did have additional staff responsibilities for air issues, but these were of low priority at best. Two years later, an Army review admitted that "Personnel trained for duties necessary to close air support were not available and no organization was in being. Personnel had no idea of the capabilities of close air support properly executed."<sup>38</sup> On paper, the two services had the doctrine to execute joint air-ground operations.

The Army had failed to live up to its prewar arrangements to support that air-ground system. FAF personnel and equipment started to arrive in July, but EUSA was unable to staff its part of the joint operations center (JOC), the air-ground organization doctrinally designated to coordinate tactical air operations. In fact only two members of the EUSA staff could be identified as even familiar with the contents of the Air-Ground Operations manual, FM 31-35.<sup>39</sup> In addition to the staffing requirements, the Army was responsible for establishing three communications nets: a tactical air request net, the ground liaison officer net, and an air intelligence net. The signal company designed to perform this task was in the process of being formed back in the continental United States. The lack of communications equipment became a primary problem. Unreliable land lines were generally clogged with administrative traffic. The Air Force attempted to improvise with

high frequency (HF) radios. Staff officers recounted that Lieutenant General Walton H. Walker, the EUSA commander, walked to the JOC on several occasions to personally request air strikes.<sup>40</sup>

Air Force pilots and unit intelligence personnel began making up for the Army shortages, not only at the JOC, but also at the flying units. Individual crew members were taken off the flying rotation and assigned the ground liaison officer's duties on a part-time basis. The more experienced pilots knew they needed to get better information to effectively execute their air support missions.<sup>41</sup>

Within a matter of months, Army personnel began arriving to fill the vacancies, first in the air-ground operations section of the JOC, and then in the ground liaison teams at the fighter-bomber groups. Initially, a single GLO was assigned to each airstrip supporting an air group or separate squadron. As more personnel became available, an enlisted clerk and eventually a second officer would be assigned.<sup>42</sup> The supporting 20th Signal Company, Air-Ground Liaison, Army, did not arrive until September of 1950 and the GLO communication nets were not established until October. The G-2 Air nets, over which much of the intelligence information needed by ground liaison teams was transmitted, were not operational until the following January. However, as soon as the GLO nets were functioning, communications with forward ground units and the air-ground operations section at the JOC did improved greatly.<sup>43</sup>

The Office of the Chief of Army Field Forces and Headquarters, Tactical Air Command issued a joint training directive on 1 September 1950. Its purpose was to fill in the operational and organizational detail left out of the 1946 Field Manual 31-35. A joint Fifth Air Force-Eighth Army Air-Ground Operations Board reviewed the directive and confirmed its applicability to the Korean theater. They made several recommendations to improve communications and operational capabilities

based on experiences with the rugged Korean terrain. Throughout 1951, both EUSA and FAF undertook steps to improve the air-ground system.<sup>44</sup> Two specific problems they attempted to address were communications and personnel.

In early 1952, the Eighth Army replaced the high frequency SCR-399 radios being used by all three air-ground nets with the AN/GRC-26, radio teletype. This improved ground liaison team communications with the JOC and forward units. In addition to a voice capability, it also allowed for "hard copy" permanent records of all message traffic received and transmitted by the GLTs. This greatly simplified the administrative operations of the GLOs, their enlisted clerks, and signal teams.<sup>45</sup>

The personnel situation became an new problem by the fall of 1951. The one-year combat tour policy produced an extremely rapid turnover in experienced air-ground personnel. Earlier in March, the EUSA/FAF board had recommended establishment of a joint air-ground training school in Korea, but the overhead in instructors and equipment was determined to be impractical. Trained GLOs were coming out of the stateside school too slowly and lacked experience in theater operations. By the fall of 1951, the Commander in Chief, Far East (CINCFE) directed that a Far East Air-Ground Operations School (FEAGOS) be established at Johnson Field, Japan. While aimed primarily at key senior leaders, it became the only training that many GLOs originating from in-theater sources would get. The course consisted of five and one-half days of lectures and demonstrations.<sup>46</sup>

Captain Karl R. Morton was typical of the GLOs selected from within the Korean theater. A rifle platoon leader, company executive officer, and commander with the Fifth Regimental Combat Team, he was wounded and following recuperation, reprofiled and released to a

replacement battalion. He was transferred to the G-2 Air Section, EUSA. Having no formal air-ground experience, he attended the one-week air-ground orientation course and after spending two weeks at the JOC was assigned as the assistant GLO at K-6 Air base, Pyongtaek. He served in that capacity for four months from October 1951 until the end of his tour in February 1952.<sup>47</sup>

While specific GLO duties remained mostly unchanged from the those of the European and Pacific theaters during World War II, the daily process in the Korean theater had several unique aspects. Nearly all information used by the ground liaison teams came from the JOC. Situation reports were transmitted to GLTs at 0430, 0800, 1100 and 1500 hours daily. During early morning staff meetings, pending operations were reviewed and air requirements estimated. At 1300 hours, FAF would host a planning conference with the Air-Ground Operations Section represented. At 1600 hours, information concerning the number and types of sorties anticipated for the next day were passed to wing operation centers. In the early evening, confirming fragmentary orders (FRAGORDs) would be transmitted. At 1700 hours, detailed GLO situation reports (SITREPs) were prepared, in the five paragraph order format, for the next days operations. They included situation overlays, the updated bomb lines, dispositions of friendly and known or suspected enemy forces, and copies of the operational orders and future plans of the ground units to be supported. Hard copy operations orders (OPORDs), from the Air Force side of the JOC, were consolidated and sent out around 2400 hours by air courier. These orders were transported with accompanying "GLO Envelopes" containing the GLO situation reports, SOIs, photographic products, and any other available planning aids.<sup>48</sup>

For the GLOs at the air bases, the typical day started around 2200 hours with a review of the days events and significant message

traffic. The courier plane from the JOC arrived between 2400 and 0400 hours. After digesting the air OPORDs, GLO SITREPs, intelligence summaries, and friendly operations orders and plans, the GLO would post changes to the appropriate map overlays and prepare the day's mission briefings. Typically the GLO used one 1:250,000 scale situation map for general information and one of four 1:50,000 scale situation maps for each of the forward Corps specific information. Just before dawn the first mission briefings started and would continue periodically until approximately 1500 hours. Briefings were conducted together with the air unit operations officer and intelligence staff and covered both general situation and mission specific information. Updates were provided as information was received from the air-ground operations section at the JOC.<sup>49</sup>

The first debriefings would start around noon and run until the last mission was completed, near 1900 hours that evening. Using formatted outlines the GLO would record the postmission data and pass it to the GLT's enlisted clerk. The clerk would extract pertinent information and pass it by phone to the signal team's teletype van located elsewhere on the airfield. Important sightings would be passed directly to the JOC via voice traffic or land line. This process would continue until all of the mission had been debriefed. Most fighter-bomber groups averaged twenty-four to forty missions a day. After the last mission was debriefed, the GLO composed a consolidated daily GLO report for transmission to the JOC and would then brief the oncoming GLO prior to his meeting of the courier plane.<sup>50</sup>

On "non-briefing days," GLOs conducted instruction for newly arrived pilots on friendly and enemy ground tactics, organization, capabilities, recognition procedures, and basic combat survival skills. Often they flew on combat missions, whenever possible, to get a better

appreciation for the pilot's perspective of air-ground operations. Sometimes for major operations, the GLOs would conduct direct coordination with the ALO of a specific division or corps. This was usually done at the ground unit's location, and the GLO would take several pilots along with him when possible. Periodically, direct coordination also was done with the air-ground operations section at the JOC. The hours in a GLO's day were not hard to fill.<sup>51</sup>

Some researchers claim that the only differences between the air-ground systems in World War II and Korea were some of the organizational names.<sup>52</sup> USAF records estimated that approximately 20 percent of all FFAF sorties during the three years of fighting were in close support of ground troops. Major General O. P. Weland estimates that 30 percent of all combat sorties flown during the last two years were close support. Either case greatly overshadows the 10 percent attributed to the same missions during World War II.<sup>53</sup> Regardless, what was important was the effectiveness of the support, not the number of sorties, and General Mark W. Clark professed in 1954 that, "When the foot soldier needed close air support, he got it."<sup>54</sup>

An EUSA and FAF Joint Air-Ground Operations Conference was held in Seoul in August of 1953 to "review air-ground operations as developed and practiced during the Korean action" and to "recommend improvements to procedures and doctrine for future operations." Concerning ground liaison team operations the final report noted "difficulty in securing necessary information" for premission briefings due to limited courier services, should direct communications links to the JOC be interrupted. The report described GLO operations as "extremely important" and also recommended that "GLO activity should be extended to all air units participating in air-ground operations," rather than limited to airbase/group level. The report suggested that GLOs should be field

grade officers, experienced and trained in air-ground operations.

Combat experience within the theater of operations was also desired.<sup>55</sup>

To insure that trained air-ground personnel were "kept in being at all times," the Army established a new officer military occupational specialty (MOS). MOS number 2164, Air-Ground Operations Specialist, covered GLOs and both G2 and G3 air personnel. Under the new headquarters, field army, table of organization and equipment, there were now authorized twelve MOS 2164 GLOs in the grade of major, twelve 2164 GLOs in the grade of captain, six clerk-typist corporals, and six clerk-typist privates first class. The USAF Air-Ground Operations School also developed lesson plans on air-ground operations for use by all Army service schools, which included instruction concerning GLO duties and responsibilities. The Army section of the school proposed to the Air Support Branch of Headquarters, Army Field Forces, that a six-week course of instruction be established to award the new MOS. The section hosted the first annual GLO Refresher Course in November of 1953 to promote currency and standardization among GLOs and provide for the exchange of information between GLOs in the field and instructors.<sup>56</sup>

#### The Vietnam War

By the mid-to late-1950s, the Department of the Army again reduced its requirements to maintain trained and experienced ground liaison officers and teams. Partly victims of the Army's post-Korea drawdown, it was actually the U.S. Air Force's indifference that allowed the Army to reduce GLT requirements. Officially, the Secretary of the Air Force Thomas K. Finletter had stated that "the Korean War had been a unique, never-to-be-repeated diversion from the true course of strategic air power."<sup>57</sup> When it came to air support the air service's preference was toward a role of interdiction rather than one of close air support.

It quickly "dismantled" its own system of airborne forward air controllers (FACs), which had been developed during Korea, and once again began to focus on its true destiny.<sup>56</sup>

During the years leading to 1965, USAF involvement in Vietnam was rather limited. Its principle role was to advise the Vietnamese Air Force and provide training and assistance support via operations similar to FARM GATE. The first ALOs arrived in January 1962, and the first Army liaisons arrived the following month to support the AOC at Tan Son Nhut air base. Their real function was not to coordinate air-ground operations, but rather deconflict helicopter and fixed wing operations. By December 1962 the U.S. Army had 199 aircraft in Vietnam while the U.S. Air Force had only 61.<sup>59</sup> The turf wars over Army aviation were heating up throughout this entire period. While outside the focus of this analysis, they most certainly impacted on interservice relations, especially at the higher levels.

Training exercises back in the continental United States did attempt to integrate air-ground operations. Many claimed to be aimed at "perfecting new ground support techniques," but most, like the "Indian River" exercise at Eglin Air Force Base and the "Gold Fire" exercise at Fort Leonard Wood, merely used procedures similar to those first employed during World War II.<sup>60</sup> Ground liaison officers played little or no active role in the execution of these exercises.

By late 1964, GLOs were only assigned to Tactical Air Command, numbered Air Forces and selected air wings. At the Wing, GLOs focused on getting the air units to participate in these joint exercises and arranging demonstrations of current air firepower at various Army posts. There was little participation in the day-to-day training of the subordinate fighter squadrons or their pilots. In fact, many of the wing GLO positions were left vacant. The United States Continental Army

Command (USCONARC) had reduced GLO authorizations Army-wide to only twenty. This was based on the existing agreement between the service chiefs which made establishing liaison requirements the responsibility of the supported service. Since the USAF's Tactical Air Command (USAF TAC) no longer saw close air support as a significant role, it never seriously pursued GLT support. Since the Air Force was not asking, Army personnel managers saw no need to place any importance on the filling of GLO billets below the most visible levels.<sup>61</sup>

That visibility increased in April of 1965 when the Air Force began deploying fighter squadrons to the Republic of Vietnam and Thailand. The Twelfth Air Force requested that six ground liaison officers be deployed to support these air units. Three of the squadrons would be operating from Da Nang air base and three squadrons would operate from U.S. air bases in Thailand. The Department of the Army initially approved the deployment of only one GLO. The Army claimed that these were permanent change of station (PCS) moves and not deployments, as covered by the joint agreement. When the issue was expanded to include the reciprocal filling of tactical air control parties (TACPs) by the Air Force to support Army requirements, the Army personnel managers then offered to meet the Twelfth Air Force "request" by reassigning officers from within the Southeast Asian theater instead of sending the resident GLOs with their deploying air units. To the deploying squadron commanders the benefit of theater experience far outweighed any limited attachment they may have had to wing level GLOs they rarely trained with in the states. This was only the case in one instance and after the Air Force chain of command pressed on the issue, that particular GLO was allowed to deploy with one of his supported squadrons.<sup>62</sup> Throughout 1966 USAF fighter deployments drew assets from Europe, the United States, and other overseas bases. Even the

activation of some air national guard units were requested. With only twenty active duty ground liaison officers, the Army was not in a position to immediately support all the Air Force requests for trained and qualified air-ground operations personnel.<sup>63</sup>

While a number of studies address the use of air power and particularly CAS during the Vietnam War, information concerning the actual operations and effectiveness of GLO and GLTs during that conflict could not be located or properly accessed. This area is specifically addressed in the recommendations for future research. Some facts that are known concern communications. At least until the summer of 1966, GLO communications were limited to a single net rather than the three called for by the doctrinal air-ground manuals. The case for the additional nets during the Vietnam conflict was to allow the GLOs to coordinate directly with the corps and divisions they were supporting.<sup>64</sup> The remote basing of many of the Air Force assets made this critical. Coupled with the fact that the vast majority (nearly 75 percent) of CAS missions flown between 1965 and 1968 were preplanned, the GLO would have been able to prepare a fairly accurate general situation briefing. Because the targets were often relatively small and the terrain made it difficult to pinpoint locations, the FAC was again a key element in Vietnam. Pilots had a better understanding of the situation when they were briefed prior to takeoff and check-in with the FAC.<sup>65</sup>

While Brigadier General Douglas Kinnard believed "there is no question of the effectiveness of American air power against the conventional mode" of operations the North Vietnamese employed during the 1972 Easter Offensive, satisfaction with CAS probably depended mostly "on when those officers served in Vietnam and on the circumstances under which they saw combat."<sup>66</sup>

## The Persian Gulf War

After 1975, the Air Force made a "conscious effort to put Vietnam behind it." The Air Force believed that, as in Korea, it had been "diverted" from the genuine road to true air power, and desired to return to the conventional and strategic realm and remind itself and the world that it was still the premier air power in existence.<sup>67</sup> The Army, meanwhile, would also go through its own reappraisal and embody its catharsis in AirLand Battle doctrine as described in the 1982 revision of Field Manual 100-5, Operations. The criticality of the integration of effective air-ground operations under this doctrine was both obvious and stated. It became the centerpiece for combat development throughout the Army, almost.

The doctrine governing the Army's air-ground operations had been last revised in 1973. Both the 1970 and 1973 versions of Field Manual 100-26, The Air-Ground Operations System, had been published to merely incorporate changes to the operational vernacular since FM 31-35. In the years preceding the Persian Gulf War, numerous drafts of both joint, multiservice and related Army field manuals were circulated. Every "new" doctrinal publication generated new terms and organizational names with minor changes to equipment and manning. To this day, it appears that FM 100-26 continues to be waiting for all the players to be finalized before it is revised. Sadly, it was still the authoritative manual on air-ground operations and ground liaison officers.

The entire extent of ground liaison officer material was reduced to two paragraphs. The first, stated that GLOs would be provided from the field army, G3 section, to senior tactical fighter "units" and each tactical fighter base. The second paragraph outlined their duties. These responsibilities remained very generic, to include: "advising and assisting" air unit commanders on "matters pertaining to Army

operations"; maintaining a current ground situation map; assisting in the briefing and debriefing of fighter aircrews; and coordinating "Army plans for CAS with the tactical fighter unit."<sup>68</sup> Which air "units" were to be assigned a GLO remained unclear and the general nature of the specific duties were quite open to interpretation. A single GLO, assigned to a wing level position, could not possibly brief and debrief the aircrews of all the subordinate squadrons. He could, however, "assist" the intelligence staff by providing general ground situation information for them to incorporate into their briefings and request that certain questions of ground significance be included in their debriefings.

In 1984, Field Circular 100-26, Air-Ground Operations, published by the Army Command and General Staff College, erroneously described GLOs as part of the Air Force tactical air control system. It also stated that ground liaison officers were infantry or armor majors, who possessed the additional skill identifier of 5U, air operations qualified. As of that date, it was the only manual that still described any communications equipment dedicated to support GLOs. According to the field circular, GLOs still had voice and radio teletype assets to enter the GLO operations net maintained by the battlefield coordination element (BCE) at the Air Force tactical air control center (air operations center).<sup>69</sup>

In actuality, no formal structure for ground liaison officers or teams existed. Under a 1965 memorandum of agreement (MOA) between the Army and Air Force Chiefs of Staff, requirements for liaison between the services were to be determined by the component commanders in each theater of operation.<sup>70</sup> This MOA was further amplified concerning ALOs, FACs, and TACPs by the 1984 MOA between the service chiefs commonly referred to as the "31 Initiatives." No mention of ground liaison

officers was made in that document.<sup>71</sup> In essence, each theater would determine what, if any, requirements existed for ground liaison officers or teams. These requirements were specified in theater-level inter-service MOAs and local regulations and command directives would govern GLO operations.

For the majority of forces allocated to the U.S. Central Command (USCENTCOM) for operations during the Persian Gulf War, the governing MOA was between the Army's Forces Command (FORSCOM) and the Air Force's Air Combat Command (ACC). Under this agreement GLOs were only provided down to designated fighter wing level. At the time deployment operations commenced on 8 August 1990, a number of these ACC wing positions had been left vacant. The G3 Section, FORSCOM directed its subordinate corps to fill the positions in accordance with the allocation table in FORSCOM Regulation 614-2. A number of the positions were the responsibility of XVIII Airborne Corps which was in the process of mobilizing to deploy the bulk of the corps to Saudi Arabia. To meet these requirements, the corps dipped into a pool of officers available due to the "stop loss" action, which froze separations and transfers. They may not have had any ground liaison experience, but ACC wings did not deploy without GLO support.<sup>72</sup>

It quickly became apparent that additional air assets would be needed to meet air-ground requirements. United States Air Forces in Europe (USAFE) was directed to provide A-10, F-16, and F-111 aircraft to augment those already flowing to the Central Command's Air Forces (CENTAF). Some of these air units deployed as separate squadrons, others as wings. The USAFE units pasted their troop lists to the ACC units they were to augment prior to departing Europe. The gaining commands informed the USAFE units to delete their GLOs from the troop lists, since wing GLOs were already on station with the ACC units.

This caused confusion among the USAFE units. Under the MOA within the European Command (EUCOM), permanent GLOs were assigned down to squadron level. These positions had not been vacant. In fact, all CAS and interdiction missions within the theater were briefed primarily by the squadron GLOs. They participated in all unit exercises and daily training and were an integral part of the squadrons. This was especially true for the A-10 units. The GLOs at these units were critical to normal operations and essential to all mission planning. Only after air commanders involved CINC, USAFE's staff did the ACC units reduce the restrictions. A-10 units would be allowed to deploy their GLOs, F-16 units could not. The F-111 unit was permitted to deploy its wing GLO, since one was not present at the location from which they would operate.<sup>73</sup>

Communications would prove to be another challenge. Under the FORSCOM MOA with ACC, the Army was responsible for the establishment of communications nets to link the GLOs to the BCE. Under the EUCOM MOA, the Air Force provided the communications links for GLOs, since all operations in Europe were from fixed, hardened sites and Europe had an automated communications net already in place. All GLOs in the Saudi desert had one thing in common. They were without dedicated communications.<sup>74</sup>

Based on their locations they began to improvise. Initially, some were dependent on daily runs with Air Force couriers to the AOC. When the distance was too great, they caught hops on support aircraft or tried to use any communications system available. In nearly every case, when they got to their destination the first questions they were usually asked were: who are you, why do you need to know that, and what do you do for me? Eventually, the communications lines improved, but the lack of dedicated support hindered operations. While DESERT STORM may have

been a high-technological battlefield, most GLOs fought their battle with grease pencils and rolls of acetate.

The extreme pace of the ground offensive proved many ground commanders "incapable of reporting a reliable front line trace." Yet senior staff's reported that they were successful in obtaining mission diversions through a number of air-ground liaison systems including GLOs.<sup>75</sup> Lessons learned and after-action reports from ARFOR, corps, and air units alike reported that GLOs "are vital for timely exchange of information between the Army and Air Force, and closely integrated air-ground operations." They repeatedly suggested the need for GLOs to have an automated data processing system which would allow direct access to ground and air unit information as well as provide the capability to coordinate directly with the BCE, supported ground commands, and deep targeting cells at higher echelons.<sup>76</sup>

The lone F-111 wing GLO authorized to come from Europe, became deeply involved in the precision bombing of artillery and armor positions behind the Iraqi front lines. What came to be known as "tank plinking" required detailed planning support and targeting between each mission. The only targeting details provided by the AOC were large area boxes and dated imagery of suspected positions. The F-111 GLO prepared a detail search pattern for each mission which included not only that mission's targets but provided aircraft tapes of suspected targets for subsequent night's missions. This required hours of tape to be review each day, with an eye trained to pick out self-propelled artillery and armor out of the myriad of "hot spots" behind the Iraqi lines. Since no film analysts were available, the mission fell to the GLO. He briefed missions at night and reviewed tapes by day. He caught naps by sleeping behind the operations center map board in the mission planning area. Due to his efforts the F-111, a strategic interdiction aircraft, was

credited with more armored vehicle kills than any other aircraft in the Gulf War.<sup>77</sup>

Manning of wing and squadron positions by single GLOs could not have been sustained indefinitely. After action reports suggested that GLTs should consist of at least a combat arms officer and an intelligence trained noncommissioned officer (NCO). Further augmentation is required to sustain a twenty-four hour capability.<sup>78</sup>

### Trend Analysis

#### Manning

From the initial exchange of liaison officers between Fifth Army and the XII Air Support Command, to the positioning of Army GLO's with Air Force fighter units in Saudi Arabia, there has been a reluctance to assign more than a single officer to the task. Major General McNair's hesitancy to create any more "overhead" than was absolutely necessary, seems to have haunted the manning of ground liaison teams since the general's death at Normandy.

Time and again, postwar findings suggested that teams of at least two officers and one or two enlisted soldiers were needed to properly fulfill the duties that GLOs were expected to perform. Even during conflicts where close air support was limited to strictly daylight operations, the tasks required quickly filled the available hours. The requirements for sustained twenty-four hour operations only furthered the case for more robust manning.

The assignment of GLOs to wing or group level were initially related to the command level at which most missions were planned or briefed. The trend has been to keep the assignment of GLOs to that same level of air command, while the bulk of actual mission planning over time has moved down to the squadron level. The doctrinal responsibility

to assist in the briefing and debriefing of pilots has remained throughout the evolution of the GLT; however, GLOs manning positions in the wing operation center are removed from where they can be of the most benefit. The GLOs who have understood this fact, adapted by moving from squadron to squadron when possible.

Since World War II, the number of GLOs within the Army has been at its peak at the end of each conflict. During the periods between conflicts, the lack of concern on the part of the Air Force was interpreted as license to quietly make reductions to meet other Army concerns. The numbers diminished and each new conflict started with critical positions vacant.

#### Training

Closely tied to the trend in manning was a paralleling trend in the training of ground liaison officers. The first requirement has always been to have officers with at least a basic combat arms background. Combat experience with ground maneuver forces has also always been a stated desire, though not a prerequisite. Training and experience in air-ground operations has always been the second goal. Ideally this would have been through direct experience related to previous ground assignments. Postwar reviews repeatedly recommended that the senior member of a ground liaison team should be a field-grade officer. He was at least exposed to operations above the small-unit level in most cases and most probably carried more credibility with the senior pilots of more similar rank.

The length and intensity of air-ground training seemed to be tied directly to the same cyclic pattern observed for manning. Available training was rather limited at the start of each conflict. However, it was deemed of enough importance that in-theater training

programs were initiated to make up for peacetime inadequacies. More formal courses in air-ground operations gained in popularity and usually were the most robust and detailed immediately following a conflict. The Army established a specific military occupational skill identifying air-ground trained officers, following both World War II and the Korean War. A similar additional skill identifier (ASI) exists today.

### Equipping

Probably the trend that received the greatest attention throughout the years was the lack of adequate communications support for ground liaison teams. Here again, General McNair's influence continued. Initially an Army Air Forces responsibility, postconflict reviews shifted that mission to the ground component. Once held by the Army, the trend was to robustly support the GLTs on paper, but neither equipment nor personnel were ever organized or assigned until after the subsequent conflict had started.

Both after World War II and the Korea War, detailed tables of organization and allowances established signal teams to provide the GLO communications with Army representatives at the appropriate air operations center, and to the supported ground maneuver units. After each conflict the type and quality of communications equipment provided were determined to be inadequate based on requirements of distance and the types and volume of traffic. In each situation the means existed to provide the type of support recommended. The ability to follow through with the procurement and fielding was the major shortcoming.

### Current Organizational Structures

#### USPACOM

The Pacific is probably the theater of operations least changed since the events of the Persian Gulf War. The structure of ground

liaison teams within the U.S. Pacific Command (USPACOM) area of responsibility reflects each of the identified trends. USPACOM GLTs consist of a single ground liaison officer in the rank of major or captain. This officer is permanently assigned at fighter wing level. He operates from a fixed Air Force operations facility and has no organic communications equipment at his disposal other than what the Air Force provides. For contingency purposes, the GLOs within EUSA are to be augmented during hostilities with ROK personnel at the squadron level.<sup>79</sup>

#### USEUCOM

The Army's largest permanent ground liaison teams are assigned in the USEUCOM theater of responsibility. Since the end of World War II, and throughout the Cold War, the Army has provided permanent GLTs to all air units in the USAFE with an air-ground mission. The primary reason for this arrangement has been to meet the requirements for GLTs established by agreement with the other North Atlantic Treaty Organization (NATO) nations. Within the region, GLOs are assigned to wing and squadron level positions.

For most air wings, the Senior GLO is a combat arms major with a functional area designation of operations (54A5U). A-10 squadrons have a captain and one infantry-qualified sergeant first class, permanently assigned to the squadron GLT. F-16 squadrons also have a infantry-trained sergeant first class permanently assigned as the squadron GLO. During contingency operations the wing GLO is augmented by another major, the A-10 squadrons are augmented by an additional captain and NCO, and F-16 squadrons are augmented by a captain.

All permanently assigned GLOs have attended the USAF Air-Ground Operations School. Both permanent and augmentee GLOs attend the in-

theater USAFE Air-Ground Operations Course after initially being assigned to GLO duties. Augmentee GLOs receive two weeks of annual refresher training with their designated GLTs.

While the joint MOA requires USAFE to provide all GLT communications support for fixed site operations, the Army is attempting to provide automated processing stations that will link the GLTs with the supporting BCE/BCD during deployed contingencies. Current initiatives include the portable stations similar to those being fielded for the BCE/BCD and compatible with corps and division maneuver control stations.<sup>80</sup>

#### USACOM

The ground liaison positions filled by FORSCOM to support the air units of ACC take the manning trend to a new dimension. The Air Force's primary force projection wings are now assigned GLOs that come from the Army's reserve component. A single individual mobilization augmentee (IMA) is assigned against each fighter wing within ACC. Permanent GLOs are only found at numbered air force level. IMA GLOs are to be combat arms officers in the grade of major or captain and graduates of the USAF Air-Ground Operations School. Holding mobilization orders for contingency purposes, IMA GLOs train with their designated wings two weeks each year. Currently, no equipment is designated to support ACC GLO requirements. Deploying Army headquarters are responsible to provide communications support for ACC wing GLOs as required by the situation.<sup>81</sup>

#### Summary

The preceding analysis reviewed, in length, first the origins and then the evolution of ground liaison teams provided by the Army to support Air Force units with an air-ground mission. Throughout the

years between 1942 and 1996, the Army has struggled with the proper way to organize and operate these teams, relearning the same lessons again and again. Significant cyclic trends were identified in each of the three areas of manning, training and equipping. The overall result has been that relatively little significant progress has occurred in the development of GLTs since the end of World War II and that the current sum gain may even be considered negative.

When viewed in light of these cyclic trends, current GLT structures in the Army appear to be at different stages of that cycle. Possibly by merely recognizing the very existence of these cyclic trends, the Army can stop them from reoccurring and move forward with continued improvements to a standardized structure. The following chapter will attempt to recommend at least initial actions to answer to the primary research question concerning GLT manning training and equipping.

## CHAPTER 5

### CONCLUSIONS AND RECOMMENDATIONS

#### Conclusions

How should the U.S. Army man, train, and equip ground liaison teams to support U.S. Air Force fighter wings and squadrons? This research has provided insight into the origins of the ground liaison system that currently exists to support the integration of air and ground force operations. Through a historical review, it identified the foundations of the U.S. system as first observed during the British operations in both North Africa and the Pacific. It recounted how both theaters developed similar structures and experienced many of the same lessons learned. It then traced the adaptation of these lessons into postwar doctrine and the slow, but eventual, discarding of those lessons.

The next major conflict, the Korean War, saw the resurgence of the same requirements for ground liaisons demonstrated during World War II. During this conflict, trends in the areas of manning, training, and equipping of ground liaison teams began to take form. Once again the shortcomings would be addressed and captured in after-action reports and joint service conferences. Post World War II air-ground doctrine was validated, but implementation fell victim to force reductions following the Korean War.

During the advisory years of the Vietnam War and then again prior to the Persian Gulf War, the Army would find itself unprepared to meet the support requirements of the Air Force. Luckily, in each

instance, sufficient time and individual initiative overcame the obvious limitations in manning, training, and equipping of liaisons to the tactical USAF units expected to execute ground support missions.

Finally, the research showed how the current theater structures for ground liaison are in different stages of the reoccurring cycle. The European-based force is still pursuing the typical postconflict emphasis on improving its GLT organizational capabilities, while the U.S.-based commands have already fallen back into a reduced readiness capability.

#### Recommendations

The reoccurring cycle needs to be stopped and the Army's ground liaison team structure should be standardized. With the reduction in the numbers of both air and ground units in the armed services of the United States, the two services must maximize the effectiveness of every remaining resource. To help accomplish this end, Army ground liaison teams need to be established down to fighter squadron level.

These teams need to be manned with field-grade combat arms officers and senior NCOs who possess military intelligence occupational specialties. The ability to conduct continuous operations must be provided. That requires the minimum size team to consist of four individuals.

Specialized training in not only general air-ground operations, but specific ground liaison team operations, needs to be established and maintained. Once trained, GLT personnel need to be assigned to repetitive assignments with both Army and Air Force units at increasing levels of command, from squadron, wing, to air operations center levels. Once the senior levels of service are attained, GLOs need to be single

tracked in air-ground assignments only, at the possible expense of future command.

Ground liaison teams need to be equipped to communicate on the modern battlefield with higher echelons of the air-ground operations system, as well as directly with the supported ground maneuver headquarters. They must be provided the same automated ability to display, process, query, and transmit information as the planners and executors of air-ground operations. This capability needs to be deployable, stand alone, and compatible with other GLT systems. If the force projection nature of the U.S. military is to rely on joint operational capabilities, then the liaisons that facilitate all such operations must be armed to win the information handling battle. If the selected communications systems require dedicated operators with specialized skills, then these personnel also need to be permanently assigned to the GLTs.

#### Further Research Requirements

Further research needs to be conducted in a number of areas to complete the examination of ground liaison team development and subsequently revalidate the conclusions of this thesis.

Within the limitations of this research problem, the Vietnam period requires significantly more attention. During this research, few unclassified sources containing specific information concerning ground liaison team daily operations in Vietnam were able to be located. In the context of the overall historical review, this area needs the most emphasis.

A large number of Air Force unit histories are available at the Air University Historical Archives. These may provide additional insight into the specific assistance GLOs provided to pilots and

aircrews and better quantify the effectiveness of GLTs. Also individual wing and squadron histories could provide personal contacts for survey or interview purposes.

Numerous automated information management and communications systems for battlefield command and control are currently being developed. The best system to support GLT operations has not been identified by this research project. While many are currently being tested for fielding to the force, the requirements for GLT operational compatibility need to be examined as well.

Several areas limited and delimited during this research definitely need to be pursued. As the source and model of the U.S. Army's original form of liaison for air operations, the development of the British ground liaison system should be studied, to determine if similar or different trends occurred and what impact they had on the British air-ground system. Likewise, the NATO structure and its detail needs to be examined. While the EUCOM structure has been influenced by the NATO system, some other national peculiarities may exist.

Both Army aviation and Marine aviation have unique systems of coordination and liaison with the ground maneuver forces of their respective services. What issues and processes influenced their development and any insights they may provide to Army-Air Force integration need to be reviewed. The coordination and integration of U.S. naval air assets into Marine land force operations, and especially the relationship they enjoy with organic Marine aviation could prove most beneficial.

Once the tactical aspects of ground liaison operations have been thoroughly examined, then the research focus can be shifted to study ground liaison functions supporting Air Force airlift, tactical reconnaissance, and airborne command and control operations. The roles

of ground liaison officers within higher level Air Force headquarters staffs and their relationship to the Battlefield Coordination Element/Detachment may stimulate further study as well. The history of these positions have paralleled those of wing and squadron GLOs throughout the evolution of air-ground doctrine.

#### Implications

The role of air power as a combat multiplier is essential to the success of major ground operations. Parochialism's aside, most ground commanders understand that effective employment of air attacks can shape the battlefield, suppress and neutralize significant threats, and help preserve their organic combat power for the time and place they desire. Often the mere presence of air assets may induce an opposing force to concede the field. Likewise, most air commanders understands that at the operational level, no matter how precise and devastating their attacks, a ground force must eventually close with that enemy.

The friendly fire deaths of U.S. soldiers and airmen continue to result from poor integration of these essential air-ground operations. These deaths do not occur only during desert wars or in the skies over humanitarian support operations. They also happen during every day training exercises here in the United States. They do not represent the price of freedom. Not as long as they are the result of reduced situational awareness caused by the lack of sufficient liaison.

Until more effective antifratricide means can be developed, validated, and fielded, both services must jointly work to insure that the effectiveness of existing measures are maximized. Much effort has been made over the last fifty years to improve the terminal control of close air support assets in the target area. The same effort needs to

be expended to apply the lessons repeatedly learned concerning the effectiveness of ground liaison before those missions are launched.

## ENDNOTES

### Chapter 1

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<sup>2</sup>U.S. Air Force, Air-Ground Operations School, "Course Description and Lesson Outlines," (Hurlburt Field, FL: U.S. Air Force Air-Ground Operations School, 1995), 12-12.

<sup>3</sup>See U.S. Air Force Air Combat Command, U.S. Air Force Air Mobility Command, U.S. Army Forces Command, U.S. Army Training and Doctrine Command, Memorandum of Agreement for the Assignment, Duties, and Support Guidance for Ground Liaison Officers, Theater Airlift Liaison Officers, Tactical Air Control Parties, and Air Support Operations Center Squadrons (1994), 1-20, A-1; Pacific Air Forces, Eighth United States Army, U.S. Army Pacific, "Memorandum of Agreement for the Assignment, Duties, and Support Guidance for Ground Liaison Officers, Theater Airlift Liaison Officers, Tactical Air Control Parties, and Air Support Operations Center Squadrons," Draft, (1995) 1-20; and U.S. Air Forces Europe, U.S. Army Europe, U.S. Air Force Military Airlift Command, Memorandum of Agreement: Assignment, Duties, and Support for Ground Liaison Officers, Air Reconnaissance Liaison Officers, and Air Support Operations Groups (1992), 1-15.

<sup>4</sup>Multiservice Pamphlet, FM 100-103-2, FMFRP 5-62, NDC TACNOTE 3-56.2, ACCP 50-54, PACAFP 50-54, USAFEP 50-54, TAGS: Multiservice Procedures for the Theater Air-Ground System (Washington, DC: Department of Defense, 1994), vi.

<sup>5</sup>Department of Defense, Joint Publication 1, Joint Warfare of the U.S. Armed Forces (Washington, DC: Department of Defense, 1991), 66, 81.

### Chapter 2

<sup>1</sup>Kent R. Greenfield, Army Ground Forces and the Air-Ground Battle Team, Including Organic Light Aviation, Army Ground Forces Study Number 35 (Washington, DC: Department of the Army, 1948), passim.

<sup>2</sup>U.S. Air Force, Condensed Analysis of the Ninth Air Force in the European Theater of Operations, ed. Richard G. Kohn and Joseph P. Harahan (Washington, DC: Office of Air Force History, 1984), passim.

<sup>3</sup>Michael L. Wolfert, "From ACTS to Cobra: Evolution of Close Air Support Doctrine in World War Two" (Student Report, U.S. Air Force Air Command and Staff College, 1988), passim.

<sup>4</sup>Robert F. Futrell, Ideas, Concepts, Doctrine: Basic Thinking in the United States Air Force, 1907-1960, vol. 1, (Maxwell Air Force Base, AL: Air University Press, 1989), passim.

<sup>5</sup>See Roy E. Appleton, United States Army in the Korean War: South to the Naktong, North to the Yalu, June-November 1950 (Washington, DC: Army Center of Military History, 1986), passim; and Robert F. Futrell, The United States Air Force in Korea, 1949-1953 (Washington, DC: Office of Air Force History, 1983), passim. (Cited hereafter as Futrell, Air Force in Korea.)

<sup>6</sup>See U.S. Air Force, United States Air Force Operations in the Korean Conflict, 25 June-1 November 1950, USAF Historical Study No. 71 (Washington, DC: Department of the Air Force, 1952), passim; U.S. Air Force, United States Air Force Operations in the Korean Conflict, 1 November 1950-30 June 1952, USAF Historical Study No. 72 (Washington, DC: Department of the Air Force, 1955), passim; and U.S. Air Force, United States Air Force Operations in the Korean Conflict, 1 July 1952-27 July 1953, USAF Historical Study No. 127 (Washington, DC: Department of the Air Force, 1956), passim.

<sup>7</sup>See Futrell, Air Force in Korea, passim; Roger F. Kropf, "The US Air Force in Korea: Problems that Hindered the Effectiveness of Air Power," Airpower Journal 4 (Spring 1990): 30-46; Max Hastings, The Korean War (New York: Simon and Shuster, 1987): passim; Richard G. Davis, The 31 Initiatives: A Study in Air Force-Army Cooperation, Air Staff Historical Study (Washington, DC: Office of Air Force History, 1987), passim; Thomas M. Crews, "THUNDERBOLT Through RIPPER: Joint Operations in Korea, 25 January-31 March 1951" (Military Studies Program Paper, U.S. Army War College, 1991), passim; and William W. Momyer, Airpower in Three Wars (WWII, Korea, Vietnam) (Washington, DC: Department of the Air Force, 1978), passim.

<sup>8</sup>USAF Study No. 71, passim. <sup>9</sup>USAF Study No. 72, passim.

<sup>10</sup>USAF Study No. 127, passim.

<sup>11</sup>See Robert F. Futrell, The United States Air Force in Southeast Asia: The Advisory Years to 1965 (Washington, DC: Office of Air Force History, 1981), passim; and John Schlight, The United States Air Force in Southeast Asia: The War in South Vietnam, The Years of the Offensive, 1965-1968 (Washington, DC: Office of Air Force History, 1988), passim.

<sup>12</sup>See Momyer, passim; Donald J. Mrozek, Air Power and the Ground War in Vietnam, Ideas and Actions (Maxwell Air Force Base, AL: Air University Press, 1988), passim; and Earl H. Tilford Jr., Crosswinds, The Air Force's Setup in Vietnam (College Station, TX: Texas A&M University Press, 1993), passim.

<sup>13</sup>Robert F. Futrell, Ideas, Concepts, Doctrine: Basic Thinking in the United States Air Force, 1961-1984, vol. 2 (Maxwell Air Force Base, AL: Air University Press, 1989), passim.

<sup>14</sup>Richard M. Swain, "Lucky War" Third Army in Desert Storm (Fort Leavenworth, KS: U.S. Army Command and General Staff College, 1994), passim.

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<sup>1</sup>U.S. War Department, FM 31-35, Aviation in Support of Ground Forces (Washington, DC: U.S. War Department, 1942), 5, 11-12, 23.

<sup>2</sup>U.S. War Department, FM 100-20, Command and Employment of Air Power (Washington, DC: U.S. War Department, 1943), 8-10.

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<sup>4</sup>Greenfield, 45-46, 69-70. <sup>5</sup>Ibid., 76-79. <sup>6</sup>Ibid., 79-80.

<sup>7</sup>Ibid., 83, 77-78. <sup>8</sup>Ibid., 83. <sup>9</sup>Ibid., 84, 75.

<sup>10</sup>Ibid., 29-40, 84.

<sup>11</sup>See Ibid., 84-85; and U.S. Army Air Forces, Ground Liaison Officer School, "Joint Air-Ground Action, Student Text" (Key Field, MS: U.S. Army Air Forces Ground Liaison Officer School, 1945), 1. (Cited hereafter as GLO Student Text.)

<sup>12</sup>See Greenfield, 87; and U.S. Air Force, Condensed Analysis of the Ninth Air Force in the European Theater of Operations, ed. Richard G. Kohn and Joseph P. Harahan, (Washington, DC: Office of Air Force History, 1984), 14. (Cited hereafter as Condensed.)

<sup>13</sup>See Condensed, 22; and Michael L. Wolfert, "From ACTS to Cobra: Evolution of Close Air Support Doctrine in World War Two" (Student Report, U.S. Air Force Air Command and Staff College, 1988), 67.

<sup>14</sup>Greenfield, 87-90. <sup>15</sup>Wolfert, 95, 99.

<sup>16</sup>Ibid., 108; and Greenfield, 90-92. <sup>17</sup>Condensed, 106, 124.

<sup>18</sup>See Greenfield, 93-96; and Hqs., Army Ground Forces, to CG, U.S. Army Forces in the Far East, TD, Subject: Air-Ground Cooperation, 13 February 1945, Combined Arms Reference Library, U.S. Army Command and General Staff College, Fort Leavenworth, KS.

<sup>19</sup>CG, USAAFE, to CG, Army Ground Forces, TDS, Subject: Air-Ground Cooperation, 4 May 1945, Combined Arms Reference Library, U.S. Army Command and General Staff College, Fort Leavenworth, KS.

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<sup>23</sup>Hqs., Tenth Army, to CG, Army Ground Forces, TDS, Subject: Joint Air-Ground Operations, Ryukyus, 8 August 1945, Combined Arms Reference Library, U.S. Army Command and General Staff College, Fort Leavenworth, KS.

<sup>24</sup>Ibid.    <sup>25</sup>Ibid.    <sup>26</sup>Ibid.

<sup>27</sup>Greenfield, 131-133.

<sup>28</sup>U.S. War Department, TC 17, Air-Ground Liaison (Washington, DC: U.S. War Department, 1945), 5-10.

<sup>29</sup>Ibid., 6, 13.    <sup>30</sup>Ibid., 13.

<sup>31</sup>Ibid., 12; and GLO Student Text, 1-244.

<sup>32</sup>Ideas, vol. 1, 135-147.

<sup>33</sup>U.S. War Department, FM 31-35, Air-Ground Operations (Washington, DC: U.S. War Department, 1946), 28-44.

<sup>34</sup>See U.S. Air Force, United States Air Force Operations in the Korean Conflict, 25 June-1 November 1950, USAF Historical Study No. 71 (Washington, DC: Department of the Air Force, 1952), 4 (cited hereafter as Study No. 71.); Robert F. Futrell, The United States Air Force in Korea, 1949-1953 (Washington, DC: Office of Air Force History, 1983): 60-61 (Cited hereafter as Futrell, Air Force in Korea.); and Roger F. Kropf, "The US Air Force in Korea: Problems that Hindered the Effectiveness of Air Power," Airpower Journal 4 (Spring 1990): 30-31.

<sup>35</sup>See Earl W. Ralf, "Air-Ground Operations in Korea" (Staff Study, U.S. Army Command and General Staff College, 1952), 13, (Cited hereafter as Ralf Report); and Study No. 71, 114.

<sup>36</sup>See Wolfert, 108; Study No. 71, 116; and Roy E. Appleton, United States Army in the Korean War: South to the Naktong, North to the Yalu, June-November 1950 (Washington, DC: Army Center of Military History, 1986), 62-63.

<sup>37</sup>Max Hastings, The Korean War (New York: Simon and Shuster, 1987), 255.

<sup>38</sup>Ralf Report, 6.

<sup>39</sup>See Richard G. Davis, The 31 Initiatives: A Study in Air Force-Army Cooperation, Air Staff Historical Study (Washington, DC: Office of Air Force History, 1987), 10; and Study No. 71, 26-30.

<sup>40</sup>See Thomas M. Crews, "THUNDERBOLT Through RIPPER: Joint Operations in Korea, 25 January-31 March 1951" (Military Studies Program Paper, U.S. Army War College, 1991), 25; Robert F. Futrell and Albert F. Simpson, "Air War in Korea: II," Air University Quarterly Review 3 (Spring 1951): 55-58; and Futrell, Air Force in Korea, 104-108, 89-90.

<sup>41</sup>Study No. 71, 3.

<sup>42</sup>See U.S. Air Force, United States Air Force Operations in the Korean Conflict, 1 November 1950-30 June 1952, USAF Historical Study No. 72 (Washington, DC: Department of the Air Force, 1955), 189. (Cited hereafter as Study No. 72.); William W. Momyer, Airpower in Three Wars (WWII, Korea, Vietnam) (Washington, DC: Department of the Air Force, 1978): 259; and U.S. Air Force, United States Air Force Operations in the Korean Conflict, 1 July 1952-27 July 1953, USAF Historical Study No. 127 (Washington, DC: Department of the Air Force, 1956), 209. (Cited hereafter as Study No. 127.)

<sup>43</sup>Study No. 71, 70; and Study No. 72, 188.

<sup>44</sup>Study No. 72, 190.

<sup>45</sup>See Peter M. Hose, Air-Ground Operations and Time Distribution for Close Support Air Strikes, Operations Research Office Study 54 (New York: John Hopkins University, 1952), 3; and Study No. 72, 190-191.

<sup>46</sup>See Study No. 127, 200-201; and Karl R. Morton, "Experiences of a Ground Liaison Officer," GLO Bulletin 12 (February 1954): 1.

<sup>47</sup>Ibid.

<sup>48</sup>See U.S. Army, "Standard Operating Procedures for Air-Ground Operations Section, Joint Operations Center," 16 July 1951, Combined Arms Reference Library, Fort Leavenworth, KS, 3-18; and Futrell, Air Force in Korea, 341.

<sup>49</sup>Morton, 2-3. <sup>50</sup>Ibid., 3-4. <sup>51</sup>Ibid., 5-8.

<sup>52</sup>Momyer, 258.

<sup>53</sup>Study No. 127, 184. <sup>54</sup>Ibid.

<sup>55</sup>William J. Yates, "Report on Joint Air-Ground Operations Conference" (Seoul, Korea: Hqs, Fifth Air Force, 8-22 Aug 1953), 25 August 1953, Combined Arms Reference Library, Fort Leavenworth, KS, 16-23.

<sup>56</sup>See Ralf Report, 5; "Personnel in the Air-Ground Operations System," GLO Bulletin 14 (April 1953): 4-6; "U.S. Air Force Air-Ground Operations School," GLO Bulletin 15 (May 1953): 6; "Ground Liaison Officer Training," GLO Bulletin 16 (June 1953): 3; "Ground Liaison Officer with Air Training Command," GLO Bulletin 17 (July 1953): 9; and "GLO Refresher Course," GLO Bulletin 21 (November 1953): 3-5.

<sup>57</sup>Earl H. Tilford, Jr., Crosswinds, The Air Force's Setup in Vietnam (College Station, TX: Texas A&M University Press, 1993), 182-183.

<sup>58</sup>Ideas, vol. 1, 347; and Tilford, 183.

<sup>59</sup>Robert F. Futrell, The United States Air Force in Southeast Asia: The Advisory Years to 1965 (Washington, DC: Office of Air Force History, 1981): 79, 106-107, 142; and Donald J. Mrozek, Air Power and the Ground War in Vietnam, Ideas and Actions (Maxwell Air Force Base, AL: Air University Press, 1988): 27.

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<sup>63</sup>John Schlight, The United States Air Force in Southeast Asia: The War in South Vietnam, The Years of the Offensive, 1965-1968 (Washington: Office of Air Force History, 1988), 115.

<sup>64</sup>USACDC Report, 33-34.

<sup>65</sup>Momyer, 276-277.

<sup>66</sup>Mrozek, 119.

<sup>67</sup>Tilford, 182-183.

<sup>68</sup>U.S. Army, FM 100-26, The Air-Ground Operations System (Washington: Department of the Army, 1973), 5-2, 5-5.

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<sup>70</sup>Chief of Staff Air Force, and Chief of Staff Army, Service Memorandum of Agreement for Army/Air Force Liaison Support (1965), 2-4.

<sup>71</sup>Ideas, vol. 2, 555.

<sup>72</sup>U.S. Air Force, "Operations DESERT SHIELD/STORM Lessons Learned," (Langley Air Force Base, VA: Headquarters, Air Combat Command), 1991, 53; and U.S. Army, FORSCOM Regulation 614-2, Assignments, Details, and Transfers, The U.S. Army Ground Liaison Officer (GLO) Program, (Fort McPherson, GA: U.S. Army Forces Command, 1988), A-1.

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